



Fact Sheet

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U.S. Army Engineer Research and Development Center

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Breakwater Repair at Lajes Air Force Base, Lajes, Azores

Purpose: Two-dimensional and three-dimensional physical model studies are being conducted to study repair scenarios for the breakwater at Lajes Air Force Base, Lajes, Azores. In addition, wave transmission into the lee of the breakwater is being measured for various breakwater repair scenarios. The intent of the study is to determine the optimum breakwater repair plan.

Background: The Azores islands are located in the mid-Atlantic Ocean. Praia da Vitoria is a bay located on the eastern coast of the island of Terceira in the Azores. The harbor has direct exposure to severe open Atlantic storms from the east. A breakwater was constructed in 1963 on the north side of the bay entrance to provide safe refuge and port for U.S. ships arriving at Lajes Air Force Base. A wharf is located directly in the lee of the breakwater, as shown on the attached photograph. The breakwater was originally armored with 15 t tetrapods. The armor layer has sustained significant damage beginning during initial construction. Repairs to the structure were undertaken in 1963, 1964, 1966, 1970, 1973, 1985, 2002, and 2003. The structure continues to deteriorate. In 2001, the U.S. Air Force employed the U.S. Navy to develop a permanent repair for the structure.



Facts: At the request of the U.S. Navy, two 1:56-scale physical hydraulic models were designed and constructed at the U.S. Army Engineer Research and Development Center by the Coastal and Hydraulics Laboratory to study repair scenarios. One model of a breakwater section was built in a 1.5-m wide by 61-m-long flume. A second model was also constructed; a three-dimensional model of the breakwater and bay covering a region roughly 2 km by 2 km was constructed in a directional wave basin. A 27.4-m-long multidirectional, spectral wave generator, an automated data acquisition and control system, and capacitance-type wave gauges are being used in model operation. Modifications to the breakwaters are being tested that include a CORE-LOC[®] and antifer cube armor layer with an optional fronting berm of mobile stone. The design CORE-LOC[®] weight is 31.6 t. To-date, the tested options are entirely stable. Investigations continue to identify the least cost option.

Points of Contact: For additional information, please contact Dr. Jeffrey Melby at 601-634-2062 (jeffrey.a.melby@erdc.usace.army.mil), or Mr. Dennis Markle at 601-634-3460 (dennis.g.markle@erdc.usace.army.mil).